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ABSTRACT

EuropeMMM (Efficient Use of Remote and Online Publications of Electronic Multi-Media Materials) addresses the challenge of custom-publishing of multi-media on the Internet. A EuropeMMM catalog is designed especially for teachers and trainers who need to save time and effort in developing courses which include multi-media elements. Authors and educators can select multi-media material from such a catalog and produce their own custom instructional materials. Through the use of EuropeMMM and the World Wide Web, resource-based learning becomes widely accessible to students, while at the same time reducing the costs of production through shared intellectual capital. This paper describes how EuropeMMM allows authors and educators to select multi-media materials from a central, transnational Web site to produce their own custom material for teaching or other purposes. It also provides details on how multi-media content can be contributed to the central repository. Six figures illustrate steps in the material development process. (Author/DLS)

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Increasing Teaching Productivity with EuropeMMM

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Abstract: EuropeMMM- The Efficient Use of Remote and Online Publications of Electronic Multi-Media Materials addresses the challenge of custom publishing of multi-media on the Internet.
A EuropeMMM catalogue is designed specially for teachers and trainers who need to save time and effort in putting together courses which include multi-media elements. Authors and educators can select multi-media material from such catalogue and produce their own custom material for teaching or other purposes. Through the use of EuropeMMM and W3, RBL becomes widely accessible to students while at the same time reducing the costs of production through shared intellectual capital.
In this paper we describe how EuropeMMM (http://wbt.iicm.edu/EuropeMMM) allows authors and educators to select multi-media materials from a central, transnational W3 site to produce their own custom material for teaching or other purposes. We also provide details on how multi-media content can be contributed to the central repository.

1. Introduction

The issues of teaching, productivity, and instructional technology can be considered from a number of differing perspectives. The need for increased productivity in tertiary teaching is driven by an internet-based, international level of competition and constrained institutional budgets. It would appear that more instruction must be delivered to more students in more physical locations within existing budgets or there will be significant restructuring within academia.

Marketplace forces have come to the ivory tower. Fortunately technology may have a role to play in the solution. The Dearing Report [Dearing, 1997a] has noted a need to shift from teaching methods with high variable costs to those with lower variable costs. It also noted that investment in new technology has led to higher costs but without immediate improvements in efficiency. Teaching methods were considered across three major categories: lectures, small groups and resource based learning (RBL) The argument that institutions must increase enrolment without encountering a high marginal cost for each additional student is supported by the analysis of costs associated with the development of resource based learning. RBL, as defined by Dearing, is a combination of lecture notes, courseware, CDs, and customised spreadsheets - not the powerful multi-media products currently available. Yet the financial impact of RBL is such that adding interactivity and communications technologies to a course of study, with its attendant increased development costs, can be realistically amortised over a larger student enrolment. The net result

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is "a better cost curve that is capable of withstanding expansion". [Dearing, 1997b] The optimism for an RBL solution to the cost / service squeeze may be overly optimistic given a stated maximum 200:1 ratio for development time to a student's time-on-task (contact time). Industry experience would place Dearing's development ratio in the lower quartile based upon our current capabilities for highly interactive, multi-media products. [Golas, 1994] Thus, development costs could be much greater; in fact, by a factor of three. Fortunately, the Dearing Report embraces the notion that RBL can be developed using internal and external resources and a mixture of these sources. Change agents in education and industry well understand the impact of the NIH syndrome. For personal and practical reasons instructors insist on adding their own content - placing their personal *imprimatur* on the deliverable.

Fortunately, instructional technologies can make a positive contribution to RBL by allowing the instructor to mix and match materials developed by themselves or departmental colleagues with resources developed elsewhere.

It has been argued that information technologies (IT) have not resulted in the expected increase in productivity. [Landauer, 1995] [Hitt and Brynjolfsson, 1996] In several studies, thousands of US companies have reportedly not received the expected benefits from their IT investment. Yet in less than ten percent of the cases was the problem traced to technical reasons. The principal reasons were found to be human and organisational [Griffith and Northcraft, 1996]. In education, instructional technologies often fail because of a lack of subject matter expertise, peer review, student (end-user) involvement, and multi-faceted usability testing. [Mauldin, 1996].

2. EuropeMMM

EuropeMMM – The Efficient Use of Remote and Online Publications of Electronic Multi-Media Materials – addresses the challenge of custom publishing of multi-media on the Internet.

A EuropeMMM catalogue is designed especially for teachers and trainers who need to save time and effort in putting together courses which include multi-media elements. Authors and educators can select multi-media material from such catalogues and produce their own custom material for teaching or other purposes. Through the use of EuropeMMM and W3, RBL becomes widely accessible to students while at the same time reducing the costs of production through shared intellectual capital.

Reuse of MM materials means to be able to use a piece of such material in different contexts. Generally, the term "different contexts" can be seen as different parts of a single application or different systems. In this paper, we discuss only the later part of the definition – reuse in different applications.

The main motivation for reuse is *cost*. Producing quality multi-media material is expensive and time-consuming; thus, using the same material for several applications is important, since the new applications will require less time for their development and will cost much less than developing their content totally from scratch.

Finally, reuse may be implemented with two techniques, *by-reference* or *by-value*. By-reference means that an item is referenced from two or more different contexts. By-value means that at least two copies of the same item exist in different contexts [Garzotto, Mainetti and Paolini 1995] [Garzotto, Paolini and Schwabe 1993].

Since the project deals with generating new applications we consider the By-value reuse as the most likely method.

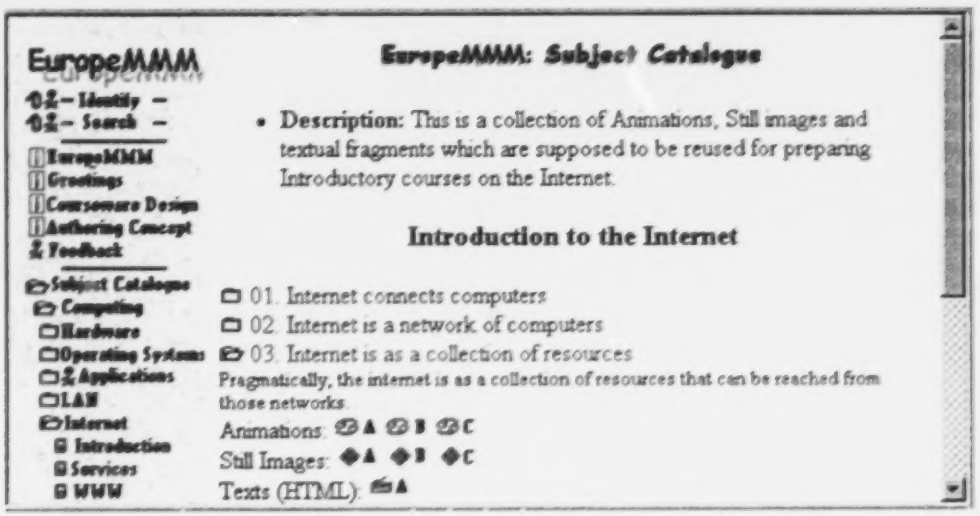
A system to support Net-based reuse of multi-media materials requires at least three components:

- a mechanism that allows individuals to access, search and browse the catalogue of existing multi-media materials to locate items of interest;
- a simple yet powerful reuse engine which allows users without any additional know-how, to reuse multi-media components;
- an interface which allows different authors contribute to the catalogue.

In this paper we describe these three components as they have been implemented in the project. It should be especially noted that the current interface, as it is presented in the paper, has received many critical notes from users and currently is a subject of re-consideration.

2.1 Browsing the Catalogue

The catalogue is built as a hierarchy of so-called indexes of reusable MM Materials. The following toolbars are used for navigating:

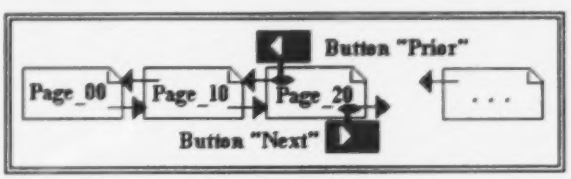


Note, the search engine on the left side toolbar which provide a convenient possibility to access a MM material of interest.

2.2 Reusing MM materials from the Catalogue

The catalogue serves so-called registered EuropeMMM authors. Each registered EuropeMMM author receives a particular User ID and Password from the catalogue administration.

The EuropeMMM authors are supposed to create their own online courses by means of reusing the material available from the catalogue. Each course created with the system, gets a unique name which is an course ID. Thus, an author having ID "Course_1" is working on the course named "Course_1". Of course, one and the same person may ask for different IDs to work on different courses. Each course is a sequence of so-called pages. Pages have names (i.e. titles) and are sorted in the ascending order of their names to automatically generate links for the forward and backward traversing of the course. Thus, for example, if there are three pages named "page_10", "page_20" and "page_30", each will be presented in the same order to users.



Course structure

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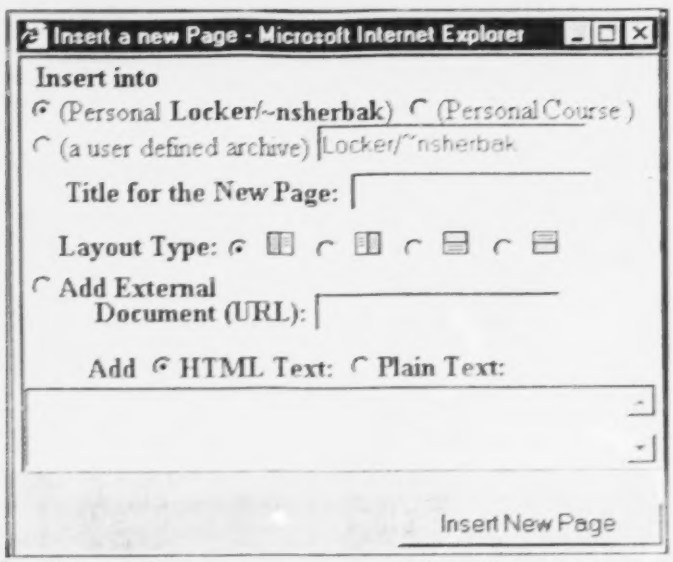
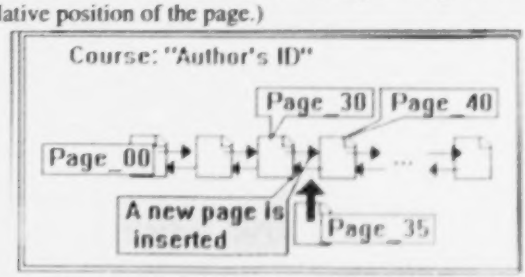
Pages can be created from scratch and uploaded into the server, or pages can be created by means of reusing MM materials from the supplementary catalogue. The process of reusing multi-media material is a fairly simple one: whenever a user accesses reusable materials that are suitable for a particular course, he/she might press a button "reuse", and a special form containing 5 fields appears:


Insert a new Page - Microsoft Internet Explorer
Insert into
(Personal Locker/~nsherbak) (Personal Course)
(a user defined archive) Locker/~nsherbak
Title for the New Page:
Layout Type:
Add External Document (URL):
Add HTML Text: Plain Text:
Insert New Page

- **Personal Locker/Personal Course** - appears automatically and corresponds to the current user's ID;
- **Title for the New Page** - a very important attribute, since it defines an order of pages within the course. (In a simple case, authors can use the following naming schema: Page_xx where xx is a number defining a relative position of the page.)



- **URL** - this field can be used by advanced users to provide direct access to some pages;
- **HTML Text /Plain Text** - actually this an author's main contribution. It is the "content" or explanations for students. It is also possible to mix existing MM material (from another source) with the author's own HTML material. The author's contribution (in HTML) may have been prepared by means of some other system, editor, or application.
- **Layout type** - defines how the applet will be mixed with your explanation. Currently there exist four predefined templates, but this number is easily extendable.

Once these steps have been completed the author is only one mouse click from the creation of a new, good looking HTML page.

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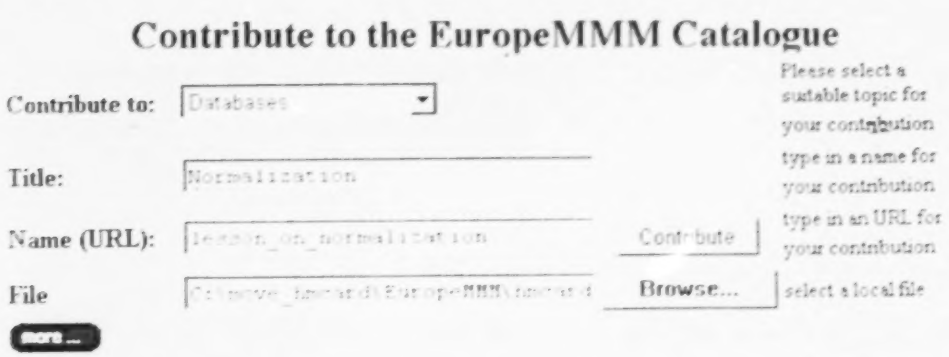
bob_L 3 - Netscape
File Edit View Go Communicator Help
EuropeMMM (Slide 4/8)
Once, Jack visited a computer-supported talk and was fairly impressed
True EuropeMMM Story
Reuse MM Material
Put into Locker
Download for Local Use
Applet Viewer running

Please note that the reusing mechanism mentioned above can be applied recursively to add more MM or HTML elements to such documents.

2.3 Contributing to the Catalogue

Contributing to the catalogue can be seen as a threefold task:

- the author physically uploads a multi-media element into the server and provides some guidance for visualisation the file and embedding it into HTML documents;
- the author places the file on a particular position within the hierarchy of catalogue indexes;
- the author provides necessary key words to simplify locating of the material by means of the search engine.



EuropeMMM utilises a simple approach to these three tasks. Thus, the system supports a list of so-called registered formats. There is no need for authors to define any additional rules for visualisation and/or reuse of files belonging to such registered formats. Obviously, such standard MM elements as still images, sound, movies, etc. are automatically recognised and uploaded using special predefined rules.

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Moreover, the system automatically assigns a necessary plug-in, determines the geometrical configuration and sets up other additional parameters for such external MM applications as Shockwave, Authorware, Flash, MM Toolbook, HM-Card and many others. Thus, in the case when an author is intending to contribute with a file in such standard formats, only a name of particular file residing on a local drive needs to be specified (see the uploading form above) and the system determines all other parameters automatically from the known extension. There exists also a rather sophisticated form for defining a new MM format (which is not discussed here).

The system uses the current user's position within the catalogue as a default place to insert information on a new contribution. If the author is not satisfied with the current position, it can be modified using the combobox on the top of the form.

After successfull uploading of the new file into the catalogue, a special form is offered to define a description of the material including ist of keywords.

3. Conclusion

EuropeMMM is a environment to assist instructors and institutions in improving instructional design and instructional delivery through the cooperative development and exchange of instructional content. Using vehicles like EuropeMMM, instructors can move beyond the book and the lecture to better engage their students, and to generate in them a genuine enthusiasm for learning and self-discovery.

As it was mentioned above, while a general idea of creating a catalogue of reusable MM materials has been enthusiastically accepted by test users, the concrete user-interface solutions were a target for substantial critical comment.

It should be noted that system's functionality is based on CGI scripts and HTML forms which do not support such advanced GUI as click and select, drag and drop, etc. Hence, it was agreed to develop a new version of the user's interface using Java programming language and, hence, supporting all the advanced features mentioned above. We hope to report on the new version of the system at the next ED-Media conference.

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